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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/680,308	10/06/2000	Hubertus J.M. Bosman	PM 274361 9271US/CON/WO	9025

909 7590 05/19/2003  
PILLSBURY WINTHROP, LLP  
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EXAMINER

GRIFFIN, WALTER DEAN

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 05/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/680,308

Applicant(s)

BOSMAN ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 25, 2003 has been entered.

### ***Response to Amendment***

The rejections described in paper no. 15 have been withdrawn in view of the amendment filed on April 10, 2003.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7, 9-12, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al. (US 3,662,015).

The Komatsu reference discloses a process for selectively hydrogenating acetylenic hydrocarbons in a hydrocarbon feed containing both mono-olefinic and acetylenic hydrocarbons. The amount of acetylenic hydrocarbons in the feed is less than 50 mole percent. The feed may contain hydrocarbons having up to 16 carbon atoms. The process comprises contacting the feed and hydrogen with a fixed bed catalyst such as nickel supported on a carrier such as alumina. The feed may be introduced as either an upflow or a downflow to the reactor. The amount of hydrogen used ranges from 1 to 20000 moles per mole of hydrocarbon to be hydrogenated. The amount of nickel in the catalyst ranges from 1 to 40 weight percent. Selective hydrogenation conditions include temperatures ranging from 20° to 250°C. A liquid hourly space velocity ranging from 0.1 to 40 is disclosed thereby indicating that the feed is in the liquid state. See col. 3, lines 71-75; col. 4, lines 1-12, 28-37, and 63-75; and col. 5, lines 1-7.

The Komatsu reference does not disclose the hydrogenation of phenylacetylene in a styrene-containing medium, does not disclose the use of  $\theta$  or  $\gamma$ -alumina, does not disclose

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carrying out the process for the claimed length of time, and does not disclose the claimed amount of phenylacetylene in the product.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Komatsu by selectively hydrogenating phenylacetylene in a styrene-containing medium because this type of feed falls within the class of feeds disclosed by Komatsu as being effectively treated and therefore phenylacetylene would be expected to be selectively hydrogenated in the process of Komatsu.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Komatsu by utilizing either  $\theta$  or  $\gamma$ -alumina because these types of alumina fall within the general class of supports disclosed and therefore would be expected to be effective.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Komatsu by operating the process for the claimed length of time because one would operate as long as possible in order to maximize the efficiency of the process.

By selectively hydrogenating phenylacetylene in the process of Komatsu, the claimed phenylacetylene amounts in the resulting product would be obtained.

Claims 13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al. (US 3,662,015) as applied to claim 1 above, and further in view of Barry (US 2,511,453).

As discussed above, the Komatsu reference does not disclose the additional metal of claim 13 or the regeneration of the catalyst.

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The Barry reference discloses a selective hydrogenation catalyst that comprises nickel supported on a carrier. The catalyst may also contain an additional metal such as gold or chromium. The catalyst may be used to hydrogenate phenyl acetylene in the presence of styrene. The catalyst may be regenerated by contacting it with air followed by reduction with hydrogen. It may also be regenerated by a steam treatment. See col. 5, line 28 through col. 6, line 16, col. 7, lines 26-33, and col. 8, lines 16-31.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Komatsu process by including an additional metal such as gold or chromium in the catalyst as suggested by Barry because these additional metals promote the desired effect of selective hydrogenation.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Komatsu process by regenerating the catalyst as suggested by Barry because the regeneration steps of Barry effectively regenerate catalysts similar to those disclosed by Komatsu and regeneration reduces catalyst costs.

Claims 1-7, 9-12, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over van der Aalst et al. (US 5,504,268) in view of Komatsu et al (US 3,662,015).

The van der Aalst reference discloses a process for selectively hydrogenating aromatic acetylene compounds present as impurities in vinyl-aromatic compounds comprising contacting the aromatic acetylene compound with hydrogen in the presence of a selective hydrogenation catalyst. Specifically disclosed feeds include styrene-containing feeds that contain phenylacetylene up to 5000 ppm as an impurity. The catalyst used in the process may be nickel supported on alumina. The process is operated with the feed in the liquid phase and utilizes

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conditions that include temperatures ranging from 0° to 50°C and LHSV values ranging from 0.1 to 50. The process utilizes a fixed bed reactor and may be operated in an upflow mode. The examples disclose styrene amounts in the feed within the claimed range and disclose phenylacetylene amounts in the product within the claimed range. See col. 1, lines 1-25; col. 2, lines 1-36 and 45-60; and col. 3, lines 1-20.

The van der Aalst reference does not disclose nickel amounts within the claimed range, does not disclose the use of  $\theta$  or  $\gamma$ -alumina, does not disclose carrying out the process for the claimed length of time, and does not disclose the claimed molar ratio of hydrogen to phenylacetylene.

The Komatsu reference discloses a process for selectively hydrogenating acetylenic hydrocarbons in a hydrocarbon feed containing both mono-olefinic and acetylenic hydrocarbons. The amount of acetylenic hydrocarbons in the feed is less than 50 mole percent. The feed may contain hydrocarbons having up to 16 carbon atoms. The process comprises contacting the feed and hydrogen with a fixed bed catalyst such as nickel supported on a carrier such as alumina. The amount of nickel in the catalyst ranges from 1 to 40 weight percent. Selective hydrogenation conditions include temperatures ranging from 20° to 250°C. A liquid hourly space velocity ranging from 0.1 to 40 is disclosed thereby indicating that the feed is in the liquid state. See col. 3, lines 71-75; col. 4, lines 1-12, 28-37, and 63-75; and col. 5, lines 1-7.

It would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the process or van der Aalst by utilizing a catalyst containing nickel amounts within the claimed range as suggested by Komatsu because such a catalyst is effective

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in the selective hydrogenation of hydrocarbons such as phenylacetylene and therefore its use would be expected to be effective in the process of van der Aalst.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of van der Aalst by utilizing either  $\theta$  or  $\gamma$ -alumina because these types of alumina fall within the general class of supports disclosed and therefore would be expected to be effective.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of van der Aalst by operating the process for the claimed length of time because one would operate as long as possible in order to maximize the efficiency of the process.

While the van der Aalst reference discloses using molar excesses of the impurities with respect to the hydrogen, the comparative examples disclose that molar excesses of hydrogen with respect to the impurities also result in selective hydrogenation of the impurities. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of van der Aalst by utilizing a molar excess of hydrogen with respect to the impurities if some styrene loss can be tolerated.

Claims 13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over van der Aalst et al. (US 5,504,268) in view of Komatsu et al (US 3,662,015) as applied to claim 1 above, and further in view of Barry (2,511,453).

As discussed above, the neither the van der Aalst nor Komatsu reference discloses the additional metal of claim 13 or the regeneration of the catalyst.



The Barry reference discloses a selective hydrogenation catalyst that comprises nickel supported on a carrier. The catalyst may also contain an additional metal such as gold or chromium. The catalyst may be used to hydrogenate phenyl acetylene in the presence of styrene. The catalyst may be regenerated by contacting it with air followed by reduction with hydrogen. It may also be regenerated by a steam treatment. See col. 5, line 28 through col. 6, line 16, col. 7, lines 26-33, and col. 8, lines 16-31.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by including an additional metal such as gold or chromium as suggested by Barry because these additional metals promote the desired effect of selective hydrogenation.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by regenerating the catalyst as suggested by Barry because the regeneration steps of Barry effectively regenerate catalysts similar to those disclosed by van der Aalst and Komatsu and regeneration reduces catalyst costs.

### *Conclusion*

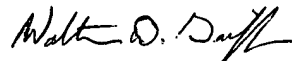
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Didillon reference discloses a process for hydrogenating phenylacetylene in a olefin stream.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Walter D. Griffin  
Primary Examiner  
Art Unit 1764

WG  
May 15, 2003